

REMARKS

Claims 1-10 remain in the application for further prosecution. Claims 11-13 were withdrawn from consideration after an election of Claims 1-10 without traverse. Therefore, Claims 11-13 have been cancelled and may become the subject of a subsequent divisional application. Claim 1 has been amended.

The drawings have been objected to as lacking certain features of the invention. In response, revisions have been made to Figures 1 and 5, as shown in the enclosed amended sheets. The original Fig. 1 includes a bottom view of the inlet port, passageway, inlet chamber and vent, as shown in a vertical sectional view in Fig. 2. The center portion of Fig. 1, now Fig. 1a; has been enlarged in new Fig. 1b and one of the array of posts is shown in Fig. 1c. In Fig. 5 the passageway between 10 and 12 is shown as dotted, since it is below the top of the microfluidic chip being illustrated. The specification has been amended for consistency with amended drawings.

Claims 1-3 and 8 have been rejected under 35 U.S.C. 102(b) as anticipated by Columbus (U.S. 4,233,029). Such a conclusion could only be reached if the elements of Claim 1 are given an overly broad interpretation.

First, while an inlet port is shown by Columbus, his device contains no capillary passageway in fluid communication between the inlet port and an inlet chamber. Even if the walls of the Columbus inlet port are considered a capillary passageway, the space between his opposed surfaces cannot be considered an enclosed chamber, since it is clear that liquid is to flow out at all four edges. Columbus describes a device intended to provide controlled multidimensional flow with a predetermined peripheral configuration (see Claim 1). In other words, liquid added to the inlet port flows across the entire surface as directed by sets of grooves

placed at an angle to each other. The present microfluidic device is clearly different, since an enclosed unidirectional capillary passageway connects the inlet port to the enclosed inlet chamber. Columbus teaches the opposite approach, as he directly states at column 6, lines 31-34, “the multidirectional flow achieved by the device as described is the overall flow occurring in two or more non-aligned directions as primarily distinguished from unidirectional flow.” From the illustrated application of the Columbus device in Fig. 9, it is obvious that the flow was intended to direct liquid out of the edges of the two-layer Columbus device.

Columbus mentions the possibility of adding reagents to react with blood or serum at column 9, lines 63-66. Even here, Columbus in essence combines his multidirectional grooves with the reaction chamber. That is, they are not distinct features as are shown by the Applicant’s in, for example Fig. 2.

As amended to define the enclosed unidirectional capillary and the enclosed inlet chamber, the Applicant’s microfluidic device is clearly distinguished from the device of Columbus and therefore is not anticipated.

Claims 1-3 and 8-10 have been rejected also under 35 U.S.C. 102(b) as anticipated by Columbus, U.S. 4,618,476. Columbus ‘476 device is significantly different from his ‘029 device. However, one skilled in the art would not find the Applicant’s invention in the ‘476 patent. The Examiner refers to Fig. 16, described at column 7, lines 15-38, which is a device intended to allow two liquids to flow side-by-side without mixing. The liquids are introduced separately through inlet ports 410 and travel along the right and left sides of transport zone 30g. The ribs are not used just to distribute liquids across the chamber, as the Examiner states, but are used to remove air from the transport zone (see column 4, lines 1-5 and 29-33). Columbus brings the two liquids in contact with ion-selective electrodes (ISE) disposed along the passage

through which the liquids pass. Columbus sums up at column 7, beginning at line 60 “As a result, two dissimilar but misible liquids introduced into zone 30g via apertures 410 will flow side-by-side, along serpentine paths, producing a junction that approximately bisects apertures 42C and is substantially free of convection mixing. Portions of each liquid, one of which is a reference liquid, are withdrawn through apertures into contact with their respective ISE’s, ...”

Thus, Columbus ‘476 does not lead one to introducing one liquid sample into an inlet port connected with an enclosed unidirectional passageway to an enclosed inlet chamber which contains means for uniformly distributing the sample across the inlet chamber. Instead, Columbus ‘476 teaches in Fig. 16 a device for measuring the properties of two liquids flowing concurrently in his device, but without mixing, which would defeat the purpose of the device.

Claims 4-6 have been rejected under 35 U.S.C. 103(a) as unpatentable (i.e. obvious) over Columbus ‘029 in view of Peters, U.S. 6,296,126 B1, the later cited for the use of wedge-shaped cut-out structures. Peters is a co-inventor in the present application, and his patent was cited in paragraph 0037 of the published application (or page 11, line 17). Claims 4-6 are dependent from Claim 1 and if, as the Applicants contend, Claim 1 is distinguished from Columbus and patentable, then Claims 4-6 should also be allowable.

Claim 7 has been rejected under 35 U.S.C. 103(a) as unpatentable over Columbus ‘029 in view of Bedingham et al, U.S. 6,734,401 B2, cited for disclosing a tapered inlet port to engage a pipette tip. As with Claims 4-6, Claim 7 should be allowable if Claim 1 is patentable over Columbus.

The remaining references, cited but not applied by the Examiners, are generally pertinent, but appear to be either cumulative to the patents just discussed or to lack some of the features claimed by the Applicants.

In view of the above remarks the Examiner is urged to allow the amended claims remaining in the application. If further amendments are believed necessary, the Examiner is invited to contact the Applicant's attorney at the telephone number provided below.

Respectfully submitted,

3/4/05
Date

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Amendments to the Drawings

Please replace Fig. 1 with the enclosed two replacement sheets

Please replace Fig. 5 with the enclosed replacement sheet.



ANNOTATED MARKED-UP DRAWINGS

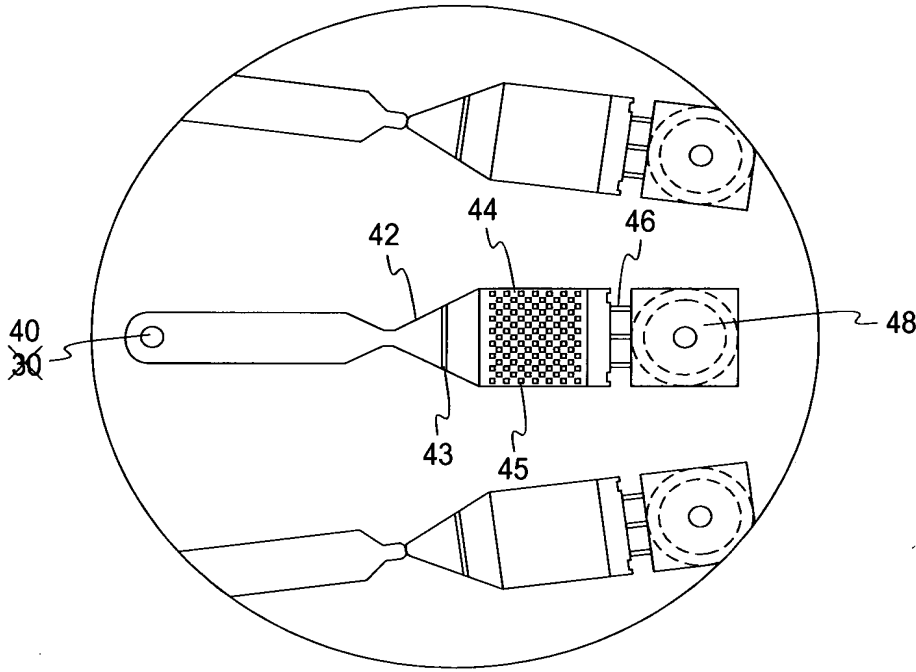


Fig. 1a

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ANNOTATED MARKED-UP DRAWINGS

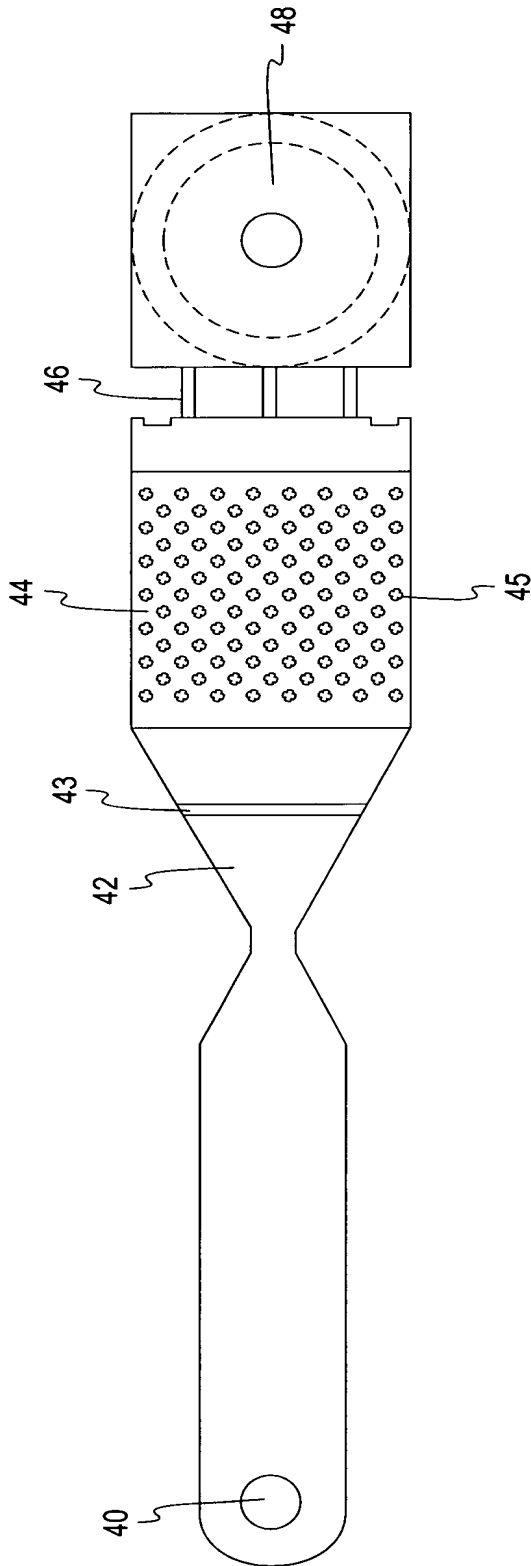


Fig. 1b

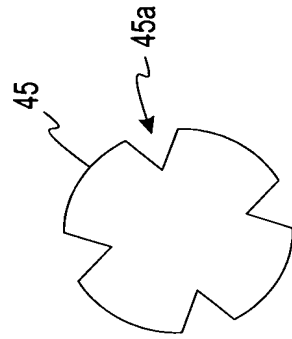


Fig. 1c

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ANNOTATED MARKED-UP DRAWINGS

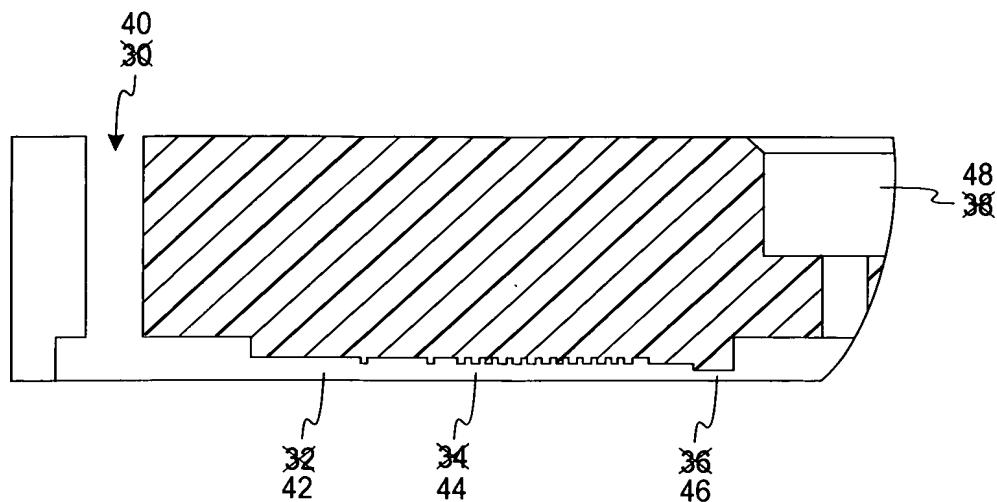


Fig. 2



Fig. 3a



Fig. 3b



Fig. 3c

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ANNOTATED MARKED-UP DRAWINGS

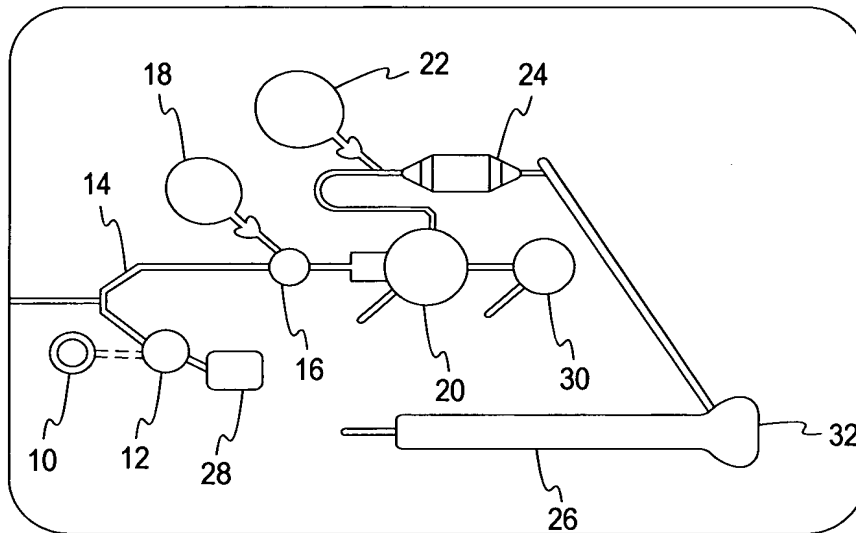


Fig. 5